QSFP Double Density 1XN Cage

1. INTRODUCTION

1.1. Purpose

Testing was performed on the TE Connectivity (TE) QSFP Double Density 1XN Cage to determine its conformance to the requirements of Product Specification 108-60122 Rev A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of 1XN CAGE. Testing was performed at the Shang Hai Electrical Components Test Laboratory between 10DEC18 and 10JAN19. The test file number for this testing is TP-18-03622. This documentation is on file at and available from the Shang Hai Electrical Components Test Laboratory.

1.3. Conclusion

QSFP Double Density 1XN listed in paragraph 1.5, conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-60122 Revision A .

1.4. Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Quantity	Part Number	Description
20	2324882-2	1X4 QSFPDD CAGE with Heatsink
10	2318579-2	QSFPDD PT CONNECTOR
10	2323767-1	Cable assembly QSFPDD
15	60-1942764	Test PCB

Figure 1.5

1.5. Environmental Conditions

Unless otherwise specified, the following environmental conditions prevailed during testing:

Temperature: 15 to 35°C
Relative Humidity: 20 to 80%

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1.6. Qualification Test Sequence

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Table 2

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Initial examination of product	1	1	1	1
Durability	4			
Mating force	2,5			
Un-mating force	3,6			
Rotational cable pull	8			
Module retention force	7			
Cage Latch Strength				3
Temperature life (Precondition)				2(c)(d)
Salt Spray		2		
Compliant pin insertion force			2	
Compliant pin retention force			3	
Final examination of product	9	3	4	4

NOTE

a. See paragraph 4.1.A.

b. Numbers indicate sequence in which tests are performed.

c. Precondition specimens with 20 durability cycles with latches engaged.

d. Mated to blank transceivers (no components added to cable connector PCB)

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance (C of C) was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

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2.2. Random Vibration - Test Group 1

Following vibration testing, no evidence of physical damage detrimental to product performance was visible.

2.3 Mechanical Shock - Test Group 1

Following mechanical shock testing, no evidence of physical damage detrimental to product performance was visible.

2.4. Durability - Test Group 1

No evidence of physical damage detrimental to product performance was visible as a result of mating and un-mating the specimens with the cage latches engaged 100 times.

2.5. Transceiver Mating Force - Test Group 1

All transceiver mating force measurements were less than 90 N when mate cable plug into Cage with Connector

Test Item	Condition	Test Result			
		Max	Min	Ave	Unit
Mating force	Initial	30.05	22.39	26.53	N
Mating force	Final	25.86	18.37	21.71	N

2.6. Transceiver Un-mating Force - Test Group 1

All transceiver un-mating force measurements were less than 50 N when un-mate cable plug from Cage with connector by pulling at latching release feature

Connector

Test Item	Condition	Test Result			
		Max	Min	Ave	Unit
Un-mating force	Initial	23.11	20.35	22.00	N
Un-mating force	Final	23.07	17.63	20.10	N

2.7. Module retention force - Test Group 1

No damage to module and displacement of cage below≦90 N

2.8. Rotational Cable Pull - Test Group 1

There was no displacement of the cage assembly or connector from the PCB when subjected to a minimum load of 33.4 N

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2.9. Salt Spray - Test Group 2

No galvanic corrosion on dissimilar metal, No crack, no deformation.

2.10. Press-fit Insertion Force - Test Group 3

All press-fit insertion force measurements were less than 40N per cage pin

Test Item	Test Result			
	Max	Min	Ave	Unit
Compliant pin insertion force Per pin (Average)	30.9	27.38	28.91	N

2.11. Press-fit Extraction Force - Test Group 3

Cage press-fit extraction force measurements were greater than 9.5N per pin of cage

Test Item	Test Result			
	Max	Min	Ave	Unit
Compliant pin Extraction force Per pin (Average)	14.39	11.85	13.07	N

2.12. Temperature life, Preconditioning - Test Group 4

No evidence of physical damage detrimental to product performance was visible as a result of temperature life, preconditioning testing.

2.13. Cage Latch Strength - Test Group 4

All cage latch strength measurements were greater than 125 N minimum.

Test Item	Test Result			
	Max	Min	Ave	Unit
Cage Latch strength	211.4	166.8	185.3	N

2.14. Final Examination of Product - All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1. Initial Examination of Product

A C of C was issued stating that all specimens in this test package were produced, inspected, andaccepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

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3.2. Random Vibration

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 20 and 500 Hz. The spectrum was flat at 0.02 G^2/Hz from 20 to 500 Hz. The root-mean square amplitude of the excitation was 3.10 GRMS. This was performed for 15 minutes in each of 3 mutually perpendicular planes for a total vibration time of 45 minutes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.3. Mechanical Shock

Mated specimens were subjected to a mechanical shock test having a half-sine waveform of 30 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.4. Durability

Specimens were mated and unmated 100 times with the cage latch operable at a maximum rate of 300 cycles per hour.

3.5. Transceiver Mating Force

The force required to mate individual specimens with the latch engaged was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm [.5 in] per minute.

3.6. Transceiver Un-mating Force

The force required to un-mate individual specimens with the latch engaged was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm [.5 in] per minute.

3.7. Module Retention force

Load cable module into connector with cage assembly applied to PCB with attached bezel. Apply specified axial load to engaged module at a maximum rate of 6.35 mm [.25 inch] per minute and hold 1 minute to very module retention and cag latch strength.

3.8. Rotational Cable Pull

Load cable module into connector with cage assembly applied to PCB with attached bezel. Rotate cable 40 degrees toward PCB, and then rotate 360 degrees with the load still applied.

3.9. Salt Spray

Subject was inserted to 5% salt concentration for 48 hours

3.10. Press-fit Insertion Force

The force required to mate individual specimens into a printed circuit board was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm [.5 in] per minute.

3.11. Press-fit Extraction Force

The force required to extract individual specimens from a printed circuit board was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm [.5 in] per minute.

3.12. Temperature Life, Preconditioning

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Mated specimens were exposed to a temperature of 105°C for 72 hours. Specimens were preconditioned with 20 cycles of durability.

NOTE *Due to the temperature rating of the cable, dummy plugs were substituted for the plug assembly.*

3.13. Cage Latch Strength

Measure fore necessary to remove module from cage assembly with latches enabled.

3.14. Final Examination of Product

Specimens were visually examined for evidence of physical damage detrimental to product performance.

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